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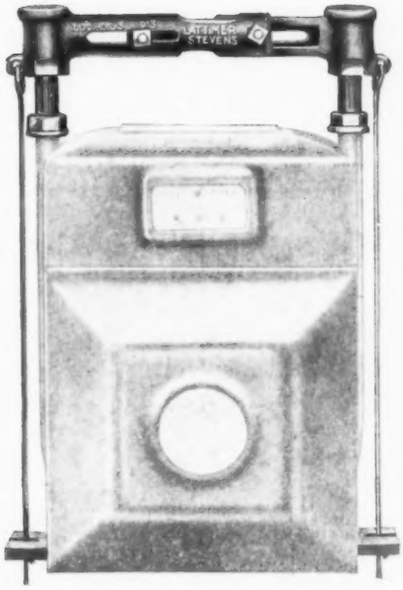

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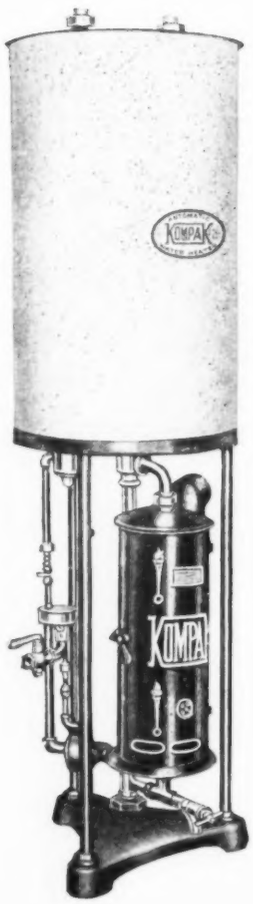

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American Gas Journal
Formerly American Gas Light Journal

Vol. CXV, No. 22 NEW YORK, NOVEMBER 26, 1921 Whole No. 3325

Comparing Prices

How to Show Your Public Some Conclusive Facts

By J. E. BULLARD

There is an insistent demand on the part of the public for lower prices. Unless some method is employed to show the people that prices are already low, this demand is quite certain to hurt business. In the case of the gas company it is taking the form of insisting upon lower gas rates. In any case it is well to do something to counteract this demand, for if nothing is done it is quite certain to become unreasonable.

Some of the automobile companies have found it worth while to prepare charts to show just how prices have varied and how the price variation in the case of the particular automobile compares with the price variation in other lines. The Dodge Motor Car Company has made a very elaborate series of such charts with curves comparing Dodge prices with various commodities that people buy and with the material that goes into the construction of the Dodge car. There is nothing new about this idea but the Dodge people have carried it a little further than it has ordinarily been carried and are using it more effectively in selling cars because these charts are being brought to the attention of prospective car users.

A gas company can very readily use such an idea and by either using the charts in the newspaper advertising or having them printed on the back of the gas bills bring vividly home to the consumers that compared with many other commodities the price of gas is still low. If nothing of this nature is done, there is likelihood that the consumers will take it for granted that the price is too high and that it ought to be reduced.

A comparison that perhaps tells a truer story than merely showing a curve showing the cost of gas in dollars is one which shows the cost in a day's labor. That is, the curve can be drawn showing what an average day's wages would buy during a given period. On this basis the price curve for gas is more nearly a straight line and on this basis also comparisons can be made with other commodities such as sugar, flour, clothing and the like.

Avoid Confusion

If a set of a dozen charts or more are made up on each basis, the result is sure to be illuminating not only to the consumer but to the gasman as well. It is interesting to compare the curves made on a dollar basis with those made on a wage basis and also to compare the gas curves on the two different scales with the commodity curves made on the same sheet.

If these curves are to be used to show the public the low comparative cost of gas it is better to make a comparison with only one commodity on each sheet. If more than two curves are shown, a gas curve and a commodity curve, the result is quite certain to be confusing to the average person. For example, if on one chart there are shown a gas curve, a sugar curve, a flour curve and a clothing curve, the average person is not going to get the vivid impression that he would if he was shown one chart making a comparison with sugar, another making a similar comparison with flour and a third making one with clothing.

Of course, this same method of price comparisons can be made for appliances as well as for gas if it is so desired. It is a method that has been and can be used for all kinds of comparisons.

Such a comparison, however, may not make the desired impression upon all classes of people. It, for example, will not impress upon them how economical it really is to use a tank water heater or a room heater. Sometimes a demonstration is of value.

A man might think that the use of a gas room heater was prohibitive in cost, yet think nothing of smoking one or two 15-cent cigars during the evening. Therefore, why not make a little demonstration in one of the windows showing the comparison between the cost of these. A gas meter equipped with a large dial and a hand geared down so that it will take from fifteen minutes to an hour for it to make a complete revolution can be connected in the gas line to the heater. In order to make the demonstration really effective, the dial should read in cents' worth of gas rather than in cubic feet of gas.

Place t' . heater and meter in the window with the heater burning. Before the heater, have a man sit smoking a cigar and reading a paper or a magazine just as he would at home and on a table at his elbow place a dial and a hand exactly like that used on the gas meter, except that the hand will not need to be connected to any mechanism.

Now as the man smokes let him measure the length of the cigar occasionally against a scale which shows how many cents' worth of that cigar has been consumed and each time let him move the hand on the portable dial ahead the right amount. Show cards will have to be used to make it plain just what each dial is recording. It is perfectly evident that it is

not going to take a very expensive cigar to make that cigar dial hand move forward faster than the gas meter dial does.

Such a comparison as this will impress the low price of gas upon people to a greater extent than some less dramatic comparison would. Of course, it is not necessary to feature such a demonstration except during the hours when there are the most people on the street. Then, however, it will be found that having the man smoking in the window will attract far more attention than would a demonstration without a real live person as part of it.

Economy to the Front

People nowadays are thinking of economy. They will be thinking more or less of economy for some time to come. Our national debt during the war rose from $10.41 to $203.06 per capita and the debt of our cities and States have also risen. This means higher taxes and the exercising of economy to pay them. Hence the appeal to the sense of economy is the appeal that is most likely to prove effective.

If it can be done, it might not be a bad idea to hold an economy demonstration in the show windows. A coal range might be installed in one window and a gas range in the other. In each, every day, the same things could be cooked and the exact consumption of the gas range recorded and the exact weight and cost of the coal used in the coal range recorded. If care is used in laying out the program the gas range will always show the greatest economy. It is bound to do so.

It might be well to offer a prize to any one who can cook the same articles as cheaply on the coal range as the demonstrator can cook them on the gas range. This would stimulate interest and, if any one could be found to take part in the contest, would show that the very best efforts were being put forth to get the best results from the coal range.

Such Comparison Is Conclusive

Such a comparison of prices is going to be far more conclusive than any mere statements. The people can see for themselves the basis upon which the comparison is being made and facts will be driven home that would not under other circumstances be driven home with such force.

The average family buys at least one newspaper every day, and a few magazines every month. The cost of these have increased. A pile of these can be stacked up in one corner of the window and a small gasometer to represent gas shown in the other corner. Then show cards can be used to show that the increase in the cost of gas since 1914 has not been as great as the increase in the cost of these magazines and newspapers. Showing the actual things with which the price comparison is being made makes that price comparison much more effective than it would be if the articles are not actually shown.

There are hundreds of different comparisons that can be made in this way, if desired. Then a person can be appealed to by showing him how much automobile fuel he is consuming when he burns coal. When he buys gas he is helping just so much to keep down the cost of motor fuel because the benzol is being recovered. When he burns coal he is destroying that benzol, so why should he not burn gas and coke.

A bottle of benzol can be shown along with gas and coke. In comparison with this either a pile of coal or a photograph of a coal pile of a size that would be necessary to perform the same amount of work as the coke pile or photograph of the coke pile that was made in recovering the quantity of benzol shown in the bottle. Show cards can be used to show what the coke will cost the consumer and also what the coal will cost the consumer. In addition to the difference in the price, he has also, when he used coke, made it possible to add just that much more to the motor fuel supply. This means a good deal to the motor car owner, for he is constantly being reminded that the gasoline supply is rapidly approaching exhaustion. All the other by-products saved can also be shown to emphasize the importance not only of using coke because it saves money to use it but because of the recovery of by-products it is more economical to use it. If only one by-product is shown a day the result will be that more and more people will come around to see the window display and will get a better impression of the importance of using coke than would be the case if all the by-products were shown at once with the result that the mind of the onlooker would become more or less confused.

Will Appeal Rate Increase

Santa Maria, Cal.—Recently the California Railroad Commission granted a rate increase to the Santa Maria Gas Company, the decision having been handed down by the State body following several hearings in the matter and a deep study of the gas situation in this city.

The rate, apparently, was very distasteful to local patrons and headed by the local city attorney, C. L. Preisker, the matter was appealed to the Railroad Commission, asking for a rehearing in the case. Following a lengthy correspondence between the attorney and the commission, a rehearing in the case has been set by the Railroad Commission.

"San Luis Obispo should be made to stand more of her share of this rate, we believe," declared City Attorney Preisker. "That is why we have petitioned the Railroad Commission for a rehearing in the matter."

The newly established schedule placed the Santa Maria rate at $1.25 per thousand cubic feet. The San Luis Obispo rate is $1.30.

Figures on the cost of operation of the plant were not made public by the commission, but from facts produced at the recent hearing Priesker believes that if the San Luis Obispo rates are $1.30, the just rate for Santa Maria should be around 90 cents. Preisker does not believe the small differential of 5 cents bears out the finds of the commission.

Preisker's point, however, has been borne out in that the Railroad Commission has seen fit to set a rehearing in the above case.

The increases over the old rate which were recently allowed by the commission had been in effect prior to 1913, and were allowed because of added labor and material costs and augmented taxes. The commission cut the company's valuation to $707,800.

The Question of Pre-heating Air for City Gas Furnaces

Adding to the Discussion of This Subject Which Appeared in the Sept. 17 Issue of the "Journal"

By O. LELLEP

In the AMERICAN GAS JOURNAL of Sept. 17, 1921, there was published an article written by me entitled "Experimental Comparison of Pre-Heated Air Furnace with Direct-Fired Furnace." In the *Gas Age-Record*, of Oct. 15, 1921, Henry O. Loebell, chief fuel engineer of the industrial heating department of the Henry L. Doherty Company and chairman of the industrial fuel sales committee of the A. G. A., took decided exception to the points brought out in my article and claims that "Recuperation does pay and should be considered for all heating operations." Although my article concluded by clearly stating, "Surveying the field of possible application, it seems safe to state that in most cases the air pre-heating does not pay for industrial city gas furnaces, although there are some few attractive possibilities as exceptions to the general rule." By "industrial city gas furnaces" I meant, as brought out in the article, comparatively small applications. I have always advocated air pre-heating in large industrial furnaces especially for high temperature, such as for rotary cement burning kilns (see *Concrete* for July ,1921). The advantages of air pre-heating were well recognized and applied more than a century ago. Air pre-heating certainly deserves serious consideration in many cases but unreservedly advocating this system will only misdirect future activities and thereby retard a sound development of the art.

The object of my investigation was to study by systematic experiments what was the saving of gas in pre-heated air furnace in comparison with a direct-fired furnace. By repeated trials it was possible to obtain from experimental results a rule or law which conforms to actual practice.

My experiments were conducted with pre-heated air temperature up to 900 deg. Fahr. and furnace temperature up to 2,230 deg. Fahr. It would be of great benefit to the industry if other unprejudiced industrial fuel engineers would conduct experiments with high furnace and pre-heat temperatures and thereby assist in forming a more accurate basis for modern furnace engineering.

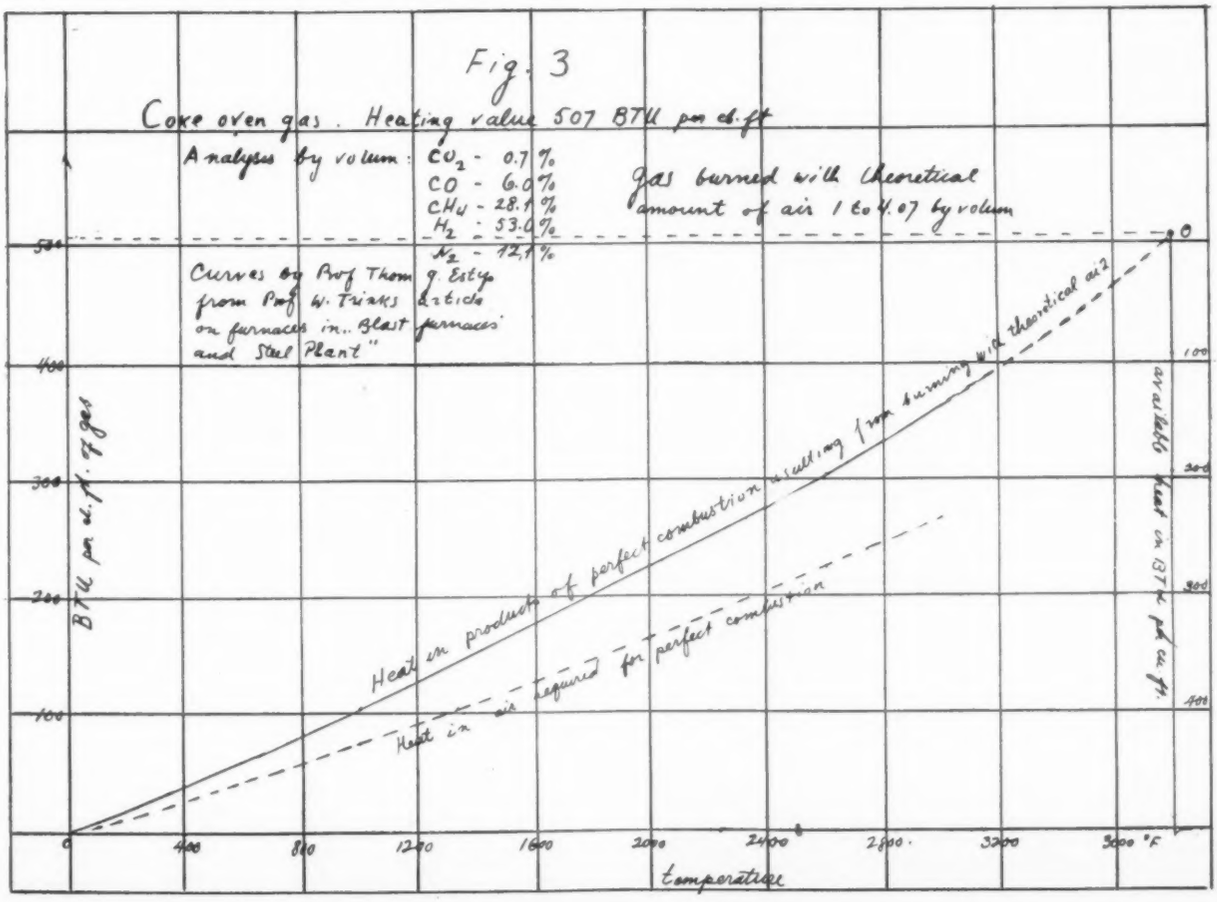
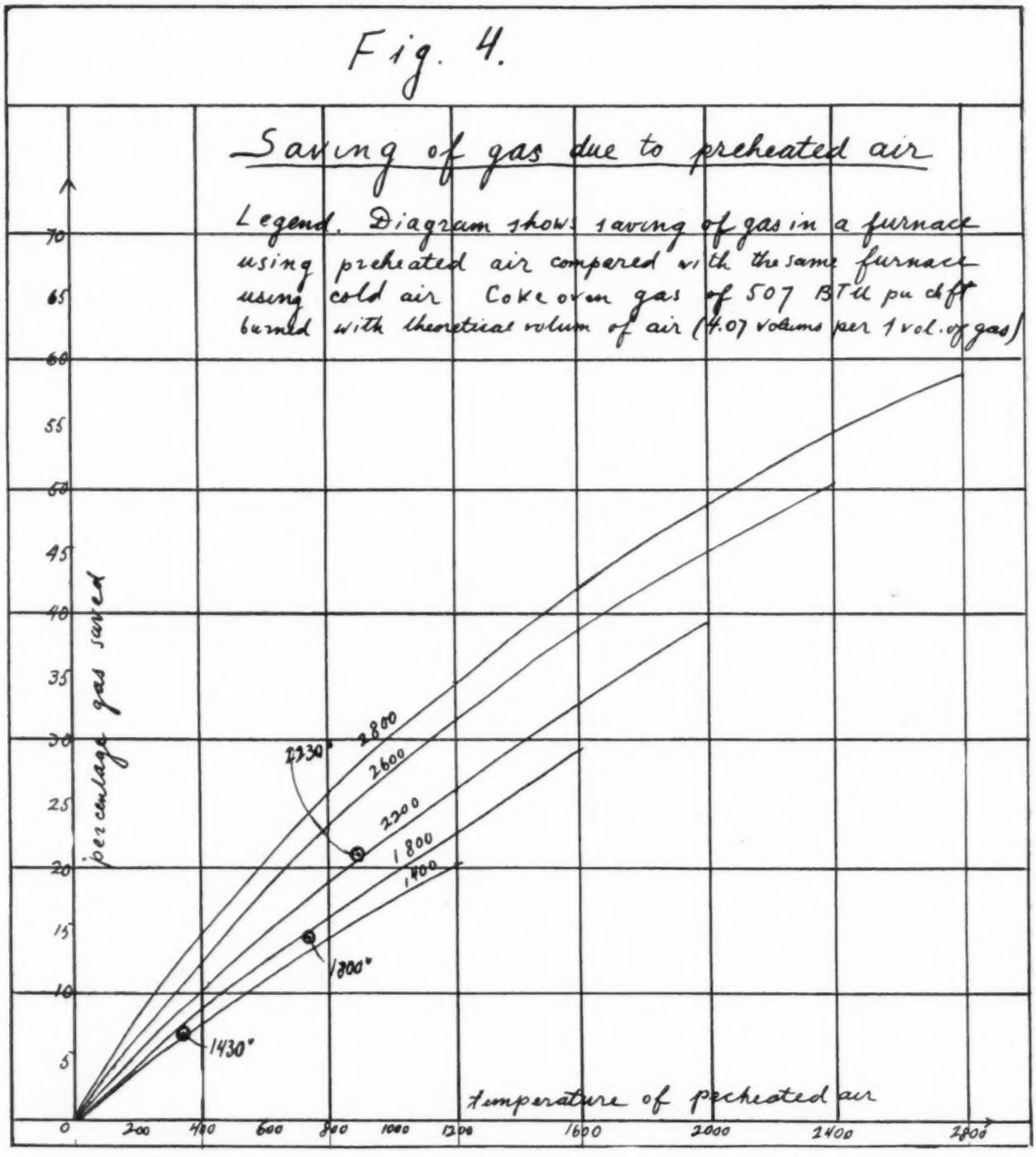


Fig. 3
Coke oven gas. Heating value 507 BTU per cu. ft
Analysis by volum: CO_2 - 0.7 %
CO - 6.0 %
CH_4 - 28.1 %
H_2 - 53.0 %
N_2 - 12.1 %
Gas burned with theoretical amount of air 1 to 4.07 by volum
Curves by Prof Thom. G. Estys from Prof W. Triaks Article on furnaces in "Blast furnaces and Steel Plant"
BTU per cu. ft. F gas
Heat in products of perfect combustion resulting from burning with theoretical air
Heat in air required for perfect combustion
available heat in 137 k per cu. ft.
temperature
0
400
800
1200
1600
2000
2400
2800
3200
3600 °F



The results shown on figure 4 are for furnace temperatures from 1,400 deg. Fahr. to 2,800 deg. Fahr. The curves show gas saving effected for the different temperatures of pre-heated air. For example a furnace temperature of 2,800 deg. Fahr. with pre-heated air of 2,100 deg. Fahr. shows a saving of 50 per cent and a furnace temperature of 1,430 deg. Fahr. with pre-heated air of 350 deg. Fahr. shows a saving of 6.85 per cent. Characteristics of the gas used for computations are shown in figure 3. The fuel consumption with and without pre-heated air under identical conditions are inversely proportional to the available heats of combustion, or by a derivation the percentage of fuel saved due to pre-heating of air is proportional to the ratio of heat in the pre-heated air and available heat of the fuel burned with pre-heated air. This was the basis on which diagram 4 was calculated and it corresponds to experimental data, for the investigated temperature range.

Mr. Loebell asserts in his article that this rule and diagram 4 applies only under conditions when the furnace is holding a certain temperature and is doing no useful work and that entirely different conditions exist when the furnace is doing useful work or, to use the conventional technical term, when the furnace is working under load.

A Basis of Comparison

In an attempt to prove that "Mr. Lellep's calculations fall down," and to bring out "the true merits of recuperation," Mr. Loebell presents certain calculations which to the casual reader would look very convincing. Every fuel engineer will, however, promptly realize what Mr. Loebell has for the moment apparently overlooked, namely that there can be a great difference how we compare the two types of furnaces. If we discuss the gas consumption we have to compare both types while they are doing the same quantity of work. Mr. Loebell, however, has on page 452 of his article compared both types while they are using the same amount of gas and sees how much more heat is left over for the pre-heated air furnace.

To illustrate the above, the characteristics of a furnace four feet long by two feet wide by two feet high, measurements, heating steel for forging purposs (furnace temperature 2,200 deg. Fahr.), fired with and without recuperation, are tabulated below:

Quite Another Subject

The amount of useful work done in the two furnaces for the same gas consumption is quite a different subject. The failure to discriminate between "under the same load" and "with the same gas consumption" makes it possible to find by calculation any percentage of saving. The only requisite being that a sufficiently inefficient load be assumed for the cold-air furnace.

We see from the table that with equal gas consumption in both types of furnaces and heavy load the pre-heated air furnace utilizes the gas heat 1.63 times better than the cold-air furnace, while with light load the heat is utilized 5.26 times better in pre-heated air furnace. We could take an extreme case. Suppose cold-air furnace heats only one-half pound of steel per hour and requires for this purpose only one cubic foot more gas than the holding, or 335 cu. ft. per hour. At the same gas consumption the pre-heated air furnace can heat 100 lb. of steel per hour, doing with the same gas consumption 200

Furnace temperature constant 2200°F. Holding gas consumption direct fired 334 cu. ft. per hr.		very light load			medium load			heavy load		
		cold air	preheated air		cold air	preheated air		cold air	preheated air	
		direct fired furnace	equal load with cold air furnace	equal gas consumption with cold air furnace	direct fired furnace	equal load with cold air furnace	equal gas consumption with cold air furnace	direct fired furnace	equal load with cold air furnace	equal gas consumption with cold air furnace
Gas consumption cu. ft. per hr. →		371	260.5	371	500	354	500	1000	705	1000
Heat received by working space in BTU	heat in hot air		28200	40000		38300	54000		75100	108000
	heat in gas	188000	132000	188000	254000	179000	254000	507000	358000	507000
	Total	188000	160200	228000	254000	217300	308000	507000	433100	615000
Heat distributed by working space in BTU	heat in gases leaving working space	92800	65200	92800	125000	88500	125000	250000	176100	250000
	heat lost through walls	85800	85800	85800	85800	85800	85800	85800	85800	85800
	heat absorbed by steel	9400	9400	49400	43200	43200	97200	171200	171200	279200
	Total	188000	160400	228000	254000	217500	308000	507000	433100	615000
Percentage gas saved due to preheating of air			$\frac{(375-260.5)\times 100}{371} = 29.8$	none		$\frac{(500-354)\times 100}{500} = 29.2$	none		$\frac{1000-705\times 100}{1000} = 29.5$	none
Available heat for heating steel per cu. ft. of gas BTU		$\frac{9400}{371} = 25.3$	$\frac{9400}{260.5} = 36.1$	$\frac{49400}{371} = 133$	$\frac{43200}{500} = 86.5$	$\frac{43200}{354} = 122$	$\frac{97200}{500} = 194$	$\frac{171000}{1000} = 171$	$\frac{171200}{705} = 243$	$\frac{279200}{1000} = 279$
Rates of heat utilization		1	$\frac{36.1}{25.3} = 1.4$	$\frac{133}{253} = 5.2$ time		$\frac{122}{86.5} = 1.41$ time	$\frac{194}{86.5} = 2.26$ times	" 1	$\frac{243}{171} = 1.4$ times	$\frac{279}{171} = 1.63$ times

Mr. Loebell admits that the gas saving during the holding period is 30 per cent if the air is pre-heated to 1,400 deg. or that the gas heat in pre-heated air furnace is 1.4 times better utilized than in direct-fired furnace. It is clearly shown by the performances of the above furnaces based upon the complete heat balance of each type that the per cent gas saved due to pre-heating the air is also the same while the furnace does work, regardless of the rate of heating, provided the same amount of work is heated by each type of furnace and the temperature of the pre-heated air remains the same; i. e., it takes 1.4 cu. ft. of gas in the cold-air furnace to each cubic foot in the recuperative furnace for holding condition for the light, medium and heavy loads.

times more useful work than the direct-fired furnace. The figures are correct only. This would be similar to drawing comparison in efficiencies between two different types of engines running one at 1/200 of load and the other at full load, which will readily be admitted is misleading.

Regarding the question of maximum rates of heating, it is general practical experience that a furnace equipped with efficient gas and air pre-mixers and proportioners using the average city gas is limited in its production solely by the melting points of the refractories used regardless of whether the air is cold or pre-heated.

Therefore, as long as it is possible to maintain the same furnace temperatures with cold air as with re-

cuperation the rate the work is heated will be practically the same. Purely theoretically an increased rate of heat transfer and a shorter time of heating should exist in a pre-heated air furnace, but whether there is any practical difference for the same furnace temperature remains to be proven. In the case of heating steel it is generally considered good practice to keep the furnace temperature as near as possible to that of the steel, and a high furnace temperature is dangerous for the quality of forgings.

Just why the quality of the heated products should be better in a recuperative furnace than that of the cold-air furnace is rather obscure. The scaling in a direct-fired furnace with efficient equipment is negligible for the short periods of heating usually required. A luminous flame such as described by Mr. Loebell is nothing more than a stratified zone of delayed combustion, with unburned fuel and air poorly mixed. It stands to reason that the uniform atmosphere resulting from instantaneous combustion would produce a better quality of product than the chaotic furnace atmosphere referred to.

There are still many advocates of the long luminous flame. The Siemen brothers were the founders of this flame theory in connection with their regenerative open-hearth furnaces for steel and glass melting. Such types of furnaces are beyond the scope of this discussion, except to point out that in the modern gas-fired furnaces the radiant flame can be more successfully replaced by the radiant incandescent walls of the furnace which transmit radiant heat in the same manner as a flame but without the adherent disadvantages. A luminous flame is a sure indication that the combustion is delayed or incomplete in the working space which means that free oxygen or unburned gases or both exist in the furnace atmosphere.

It is impossible, with the higher pre-heated air temperatures, to pre-mix the air and gas before it enters the furnace, so that this mixing in the working space causes, in most constructions, a luminous flame.

An Unfounded Belief

A more uniform temperature is another general claim made for the pre-heated air furnace. This is quite obviously an unfounded belief. Standard direct-fired furnaces are constructed which hold the temperature variations within 10 deg. Fahr. throughout their entire working zone. The number and distribution of the burners determine the evenness of heating to a large extent. The ability to distribute the mixture of gas and air by one manifold to a large number of burners when pre-heat is not used makes the burner application simpler and more flexible than is the case with the two pipes and insulation required with the pre-heat.

Another criticism of the tests referred to the inefficiency of the recuperator used. The object of the experiments as clearly stated was to establish a mathematical relationship between the pre-heated air temperatures and the gas savings. The pre-heating of the air if accomplished by running the air pipe through another furnace would have sufficed for the requirements of these tests so that the efficiency of recuperation had practically nothing to do with the results sought for.

Mr. Loebell informs us of the recent progress made in the construction of metal recuperators using the expensive heat resisting alloys. Not to discredit in the least the results of Mr. Loebell and before arriving to very optimistic conclusions concerning recuperative furnaces in general the writer would wait for some practical date from other observers, too.

Also the costs given for equipping a furnace with recuperators might be possible in the case of a gas company undertaking the installation work of recuperators for nothing. It would be interesting to have an itemized account of the labor and material covered by the $10 recuperator cost mentioned.

Regarding the per cent savings effected by recuperators in the various actual installations cited it can be said in general that nearly every gas furnace and equipment manufacturer can show the same sort of references.

The results cited such as on brass melting and forging have been obtained with automatic proportioning and premixing equipment without the necessity of recuperator complications.

The only per cent savings which have any bearing on the discussion are those effected by recuperation over the best present-day furnaces equipped with automatic premixing equipment.

In Conclusion

In concluding I wish to state that it is on account of my interest and belief in the possibilities of preheating of air for combustion which prompted me to publish the results of my investigations to date. The advantages of pre-heating air on the larger furnaces are well established. It still remains to be proved, however, in the case of the smaller installations that any material advantages exist. One of the first requisites for further advancing recuperation is a superior comparatively cheap refractory material either as a ceramic product or a heat resisting alloy. This material should not cost over 50 cents per pound and give satisfaction for years.

In the meantime any misrepresentation or exaggeration of the practical and theoretical results in this field will only tend to eventually prejudice those who should be most favorably disposed. For this reason it is particularly important to bring before fuel engineering industries refutations of biased criticisms and rely on their imporial judgment for deciding the respective merits of the case.

Atlanta Gas Light Company Applies for Increased Rates

That gas rates in Atlanta are now much lower than they are in many other Southern cities, and that the present rate is inadequate in that it does not enable the company to earn a fair percentage on the valuation of its properties, is the contention made by the Atlanta Gas Light Company in a petition filed with the Georgia Railroad Commission asking an increase from $1.65 to $1.85 per thousand cubic feet. The commission has been considering the Atlanta case for the past three or four weeks and has granted the company and the city additional time in which to file briefs before giving a final decision. A supplementary brief has also ben filed by the city in which a reduction is sought from $1.65 to $1.25.

Different Gravity Gases in Holders*

What Was Shown by a Series of Experiments

By H. E. BATES

The subject of the proper mixing of gases, of different composition and gravity, is one regarding which there is a scarcity of literature, in spite of the fact that most gas engineers, especially those handling distribution, have had the proposition to contend with. During the past few years, however, the subject has received more attention and has been discussed frequently at gatherings of gas engineers.

There seems to be a diversity of opinion as to just how much effect varying mixtures have upon appliances. Some admit that it will cause trouble, but others report no trouble experienced. Most all opinions seem to be based upon the resulting complaints, or lack of complaints where the composition of gases was changed.

The subject is becoming more important, however, and must ultimately be seriously considered and studied if companies are to give the most satisfactory service, as economically as possible. The rapid increase in the price of oil in the last few years has caused the development of a combined water gas and coal gas plant; companies are taking advantage of purchased gas from industrial concerns wherever possible, sometimes at very attractive prices, in order to improve operating costs; the depletion of the supply of natural gas in some sections of the country is causing companies to look for some other sources of supply to reinforce in part, or to substitute for entirely, the failing natural gas supply. All of these changes involve the problem of mixing gases of different gravities and composition.

Appliances, to give the most satisfactory service, must receive a supply of gas at all times as near uniform as possible. This uniformity applies to three factors, viz., pressure, heating value, and gravity. Two of these factors, pressure and heating value, have received, in the past, and are now receiving, constant attention; but how about the gravities? Do companies supplying a mixed gas know that the gravity of the gas is uniform? It may be possible that more complaints of appliance trouble are due to non-uniformity of gravity than is commonly supposed.

There are several methods of mixing gases, those best known being as follows:

1. In holders
2. By means of exhausters
3. In the distribution system
4. Water gas sets
5. A special mixing tee

The most common method of mixing different gravity gases is probably by means of holders. This is, no doubt, the best method; but even so, is it not possible that at times conditions exist so that there is not diffusion and that the mixture in the holder stratifies?

The method of mixing gases by means of exhausters is not so common but has been used to some extent in Chicago. The exhausters were street exhausters pulling on two suction lines, one a coal gas and the other a water gas. This method did not prove satisfactory and had to be discontinued.

The method of mixing gases direct in the mains of the distribution system was also tried in Chicago but caused trouble with appliances. Had it been possible to so mix the gases, a saving could have been made of more than $50 a day in pumping costs. This saving would have been produced by avoiding the second pumping of some twelve million cubic feet of gas per twenty-four hours.

Another problem which recently came to the writer's attention was in regard to a city which had been supplied for years with natural gas. The wells supplying the town were being depleted so rapidly that indications were that within a year or so the supply might be completely exhausted. A supply of coal gas was available about one hundred miles away, and a pipe line connected the point of coal gas supply with the town. Of course, it was desirable that the natural gas be used as long as the supply lasted and the shortage made up with the coal gas. This is what complicated the problem. There would be a condition existing of having a demand at times small enough so that the natural gas would be sufficient, but over peak-load periods the coal gas would be required in addition to the natural gas. There was no holder available for mixing, the one hundred miles of pipe providing storage for the surplus natural gas over the period of no consumption. Under these conditions, it appeared to be practically impossible to supply satisfactory service with such varying proportions of natural and coal gas.

The method of mixing in a water gas set has also been tried. In this case, blue water gas or carbureted water gas has been produced in the ordinary Lowe set and natural gas admitted in the top of the generator.

Natural gas and coke oven gas have been mixed by means of a mixing tee. The natural gas had so much greater velocity than the oven gas that, it was claimed, the two gases readily assimilated, and showed no indications of stratification.

It is probably true that engineers could be found who would claim that most any of these methods would produce a satisfactory mixture, but their opinion would, no doubt, be based upon general knowledge and not upon any accurate data regarding the proposition.

Obtaining Accurate Data

In order to obtain accurate data, if possible, regarding the mixing of gases, it was decided to conduct some tests and carefully note results obtained under the different conditions of mixing. It was impossible to experiment with all of the methods mentioned, so plans were made to experiment with holder mixing. It was hoped that some experiments could be conducted on mixtures in pipes, but sufficient time was not available for these pipe tests.

Because it was possible to make more accurate observations, it was thought advisable to conduct the

*Paper read at American Gas Association meeting.

experiments first on a small scale, and, if the results obtained warranted further investigation, later repeat on a larger scale. The results shown and discussed in this paper are those obtained on a holder of 1,000 cu. ft. capacity: They seem to bring out some interesting facts, and it is believed warrant the conducting of similar tests on a larger holder of 1,000,000 capacity or more. Such tests on a large holder would require rather elaborate preparation and be somewhat difficult to conduct, but, from the results obtained on a small scale, it may prove well worth the time and trouble.

It should be stated, before discussing the experiments, that no attempt will be made to draw any definite conclusions as to the proper or improper method of mixing different gravity gases in holders. Statements will be made as to what the data obtained indicates regarding mixing, but such statements should not be considered as being the final word regarding holder mixing. Before any final conclusion should be made, tests should be conducted on a large commercial holder.

Method of Conducting Tests

A single lift holder of 1,000 cu. ft. capacity was used in the test. The holder had the following general dimensions:

Tank—14 ft. 8 in. inside diameter, 7 ft. 6 in. deep.
Lift—14 ft. diameter, 7 ft. 6 in. deep.
Inlet pipe—3 in. diameter.
Outlet pipe—3 in. diameter.

Connections were made so that one of the three-inch pipes could be used as an inlet or outlet. Two sixty-light B meters were used to measure the input, one meter being connected to each three-inch pipe. Inserted through the crown of the holder, about one foot from the center, were eight quarter-inch sampling tubes. These tubes varied in length, so that a sample could be obtained at each one-foot interval through the vertical section of the bell.

The Gases Used

The two gases used were a carbureted water gas of approximately 0.62 gravity and 525 B.t.u. and a coke oven gas of approximately 0.47 gravity and 560 B.t.u. The water gas was obtained from a producing plant approximately 700 ft. from the point at which the tests were conducted. The coal gas plant was approximately thirteen miles from the testing point, the coal gas being conducted from the plant to the testing point through thirty-six-inch pipe.

The gravity of the gas flowing in or out of the holder was obtained by the following method: A half-inch pipe was run from each supply and discharge line, and a small orifice, approximately one-sixteenth-inch diameter, was inserted in this line. Ahead of this orifice was installed a wet governor, and beyond the orifice a meter was installed. The meter and governor were of a type used in photometric work, so that a rate of flow of five cubic feet per hour could be maintained. The gas flowing through the orifice discharged to the atmosphere. An inclined differential gauge gave the differential pressure across the orifice. By keeping the rate of flow constant, by means of the governor and meter, and knowing the size of the orifice, the gravity of the gas could be obtained by reading the differential pressure across the orifice and applying it to a formula. This method was suggested by R. B. Harper and gave very good results.

Simultaneous samples of the gas in the holder were taken by means of eight sampling bottles mounted on a rack. The gravities of these samples were then obtained by means of Schilling's apparatus.

Results

Six different tests were made under different conditions. It was desired to make the tests as nearly as possible similar to those actually existing in practical operation. The conditions under which the tests were made were as follows:

(a) Holder filled with two different gases through the same inlet—no output.

(b) Holder filled with two different gases through separate inlets—no output.

(c) Holder filled with two different gases but only one gas put in at a time—water gas put in first.

(d) Holder filled with two different gases but only one gas put in at a time—coal gas put in first.

(e) A heavy gravity gas was passed into a holder containing a lighter gravity gas and the mixture discharging from the holder at the same rate as input.

(f) A light gravity gas was passed into a holder containing a heavier gravity gas and the mixture discharging from the holder at the same rate as input.

The results obtained are shown in table A to F inclusive and also, in the form of curves, on curves B to F inclusive. A curve corresponding to table A was not plotted, as the table showed a very rapid diffusion.

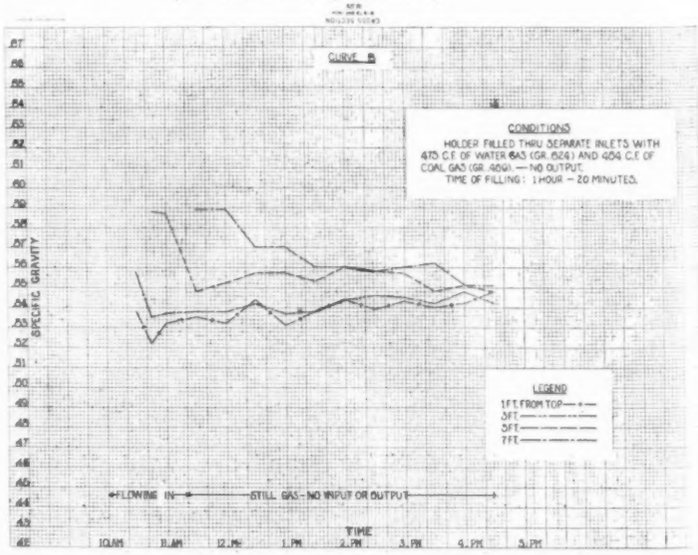
Discussion of Results

Reference to the tables, and especially the curves, shows some interesting facts. The curves show the gravities for every two-foot level, one-foot, three-foot, five-foot and seven-foot from the top or crown of holder being plotted. Curves E and F have, in addition, the six-foot level.

A study of the data and curves indicates the following:

1. The most uniform mixture of gases is obtained when two gases of different gravities are put into the

(*Continued on page* 490.)



As the Journal Views It

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The Resumption of Business

Now that actual work has been started by the arms limitation conference, there is a decidedly optimistic note being sounded on all sides as to the recovery of business and the rapid progress back to normal. There can be no doubt but that the country at large is thoroughly tired of war and a trip through the Middle West that embraced numerous cities and included discussions with men in all lines of business showed that with each day's developments in Washington are eagerly awaited with the hope that a definite constructive result will accrue.

But it has been characteristic of Americans that they have not waited until the conference had ended before going ahead with their plans. Instead, business generally has improved in remarkable shape during the past few weeks and reports on all sides are that with the holidays out of the way real prosperity will again show its face.

A large part in helping the country to recover from the effects of the war has been played by the gas industry. During the darkest hours, when there was only gloom ahead, the gas field has carried on even though it met only discouragement at the end of each effort. Probably the greatest problem that we have been confronted by has been the financing of the industry. Money has been hard to secure and when it had been gotten it was at rates that were almost prohibitive. But each demand on the industry has been met with a response that has shown the mettle of the men of the field

Of course, we are going to have our problems during the coming months and years. We are not near the millennium, even though some rash prophets so declare, but we have builded upon a sturdy foundation, and so we need not fear for the future. We are not a pollyanna, nor are we ready to declare that the gas industry is composed of anything but human beings, but we do feel that we have played our part, and that we can continue to do so. After all, that is the measure of a man, and it is by this measurement that the gas field must be judged.

English Regulation of Standards

The report made to the American Gas Association by Alfred I. Phillips of his investigations in England is an excellent addition to the discussion of calorific standards which is constantly taking place. It is very evident that the report has been carefully worked out by Mr. Phillips before being presented, and his conclusions are sure to meet with general approval. This report was published in full in the last issue of the AMERICAN GAS JOURNAL and, although it is intended to be a preliminary discussion only, it has already given gasmen a great deal to think about.

Mr. Phillips, in pointing out that there is a great difference between conditions faced in this country and in England, lays stress upon a point that has always been argued by this paper. In America each section of the country—in fact, almost every State—has a condition that is entirely different than that which exists in other parts and even in neighboring States. Out of this condition has grown the form of regulation under which the industry is operating and which has been, in many cases, brought about by the gasmen themselves for their own protection.

A significant fact in Mr. Phillips' report is the assertion that the World War was responsible for the development of calorific standards in England at a much greater speed than that with which we have developed these standards in this country, although England started with them generally later than we did.

Perhaps the most important part of this assertion is the fact that out of the existing conditions came the gas regulation act.

Regarding the methods used in charging Mr. Phillips states that it is still an open question as to whether the "therm" method will prove successful. We know of no place in the United States that could use this method under present conditions, although much is heard at rate cases regarding a marked reduction in price when the B.t.u. content is lowered. This is particularly brought out by local authorities who oppose any reduction in the calorific value of gas. It is an apt comparison that Mr. Phillips makes in asserting that it is not probable that the "therm" method of charging would prove any more popular with Americans than the "zone trolley fares."

We recommend a careful study of this preliminary report of Mr. Phillips, and we believe that the entire industry will await with a great deal of interest the more comprehensive report that has been promised for a future time.

House Heating by Vented Heaters

The Development of Ventilating Gas Heating Devices of Benefit to Industry

By L. F. BLYLER
Sales Manager, Hugo Manufacturing Company

Away back in the stone ages, primitive man built a simple structure for his abode. His house was little more than a roof that rested on the ground. In this house he made his fire in the middle of the room. The room filled with smoke, causing discomfort to the occupants. The blanket of smoke soon extinguished the flame. This was one of mankind's first worries. Instinct, rather than scientific or mechanical knowledge, forced him to make a hole in the roof to allow the smoke to escape and, "presto," the fire burned better. He did not know that the specific gravity of the heated smoke and air caused it to rise rapidly as it was expelled through the hole in the roof; neither did he know that pure, fresh air was forcing its way into the room just as fast as the heated air was being removed. This air carried with it new oxygen to combine with the carbon in the wood, which in turn was converted into carbon-monoxide and carbon-dioxide. He did not know that carbon would not burn without oxygen, nor that oxygen would not burn without carbon, that they have a fixed affinity for each other. He did not know that the reason his fire would not burn was because the carbon-dioxide spread itself over the fire and suffocated it. He was happy and contented that he had found a way to make his fire burn. The reason why his fire would burn was to be learned in the ages that were to follow. One of the most valuable contributions to the chapters on this subject was added by Professor E. P. Schoch, of the University of Texas, in his paper before the fifth annual meeting of the South Central Gas Association, during the year of 1920.

A vent pipe or chimney is a simple thing; in fact, it is so simple that any man is, or should be, capable of designing or building one. It matters little, perhaps, whether or not it is built correctly or scientifically, so long as it will draw. The log cabin with its immense fireplace was something of a refinement over the more primitive hole in the roof, and the builders of these chimneys soon learned that there were basic principles that must be adhered to in order to procure the best results.

The advent of the stove and furnace necessitated additional refinements and history is rich in its portraval of how various solid fuels were made to burn in the contraptions that were designed for that purpose.

The carbonization of solid fuels, from which gas is produced, now makes it possible to heat houses and buildings with gas. Ventilated and ventilating appliances in which gas fires function, it will be shown, should always be used for permanent heating installation. This adds another chapter to the history of ventilation.

The fit-and-try expert has given way to the engineer, and to-day ventilation and the venting of fuel-burning appliances is a science that has been contributed to by engineers, chemists and scientists. All this gives the subject a hazy aspect bristling with mystery and difficulties. The fact remains, however, that ventilation is simple and can be accomplished by any one who will follow the well-defined rules that have been developed.

It is essential that venting and the reasons for ventilation of rooms in which gas-fired heaters are used, should be given great consideration. The venting of a heater that consumes gas is not in many particulars unlike the method of venting a heater in which solid fuels are burned. Gas is more or less refined by the removal of impurities or so-called by-products. Nevertheless the products of combustion should be removed where gas is used in the quantity required for the permanent heating of rooms. Carbonic acid gas, which is known as carbon-dioxide, and carbon-monoxide and hydrogen, and the foul air given off by the exhalations of the occupants of rooms, are the principal impurities that it is desirable to remove through flues and vent pipes.

The following has to do with the flue and venting features of gas-fired heating appliances.

Flue Construction for Gas-Fired Heaters

The material for the construction of flues should be of the kinds that are acceptable to the fire underwriters for the location in which they are to be built. The kinds commonly used in enclosed walls are: Wrought or cast iron with threaded joints; cast iron with cement joints; cement sections with cement joints; tile with cement joints. In the case of cement and tile the flue sections should be provided with male and female ends. Galvanized or enameled sheet-iron pipe may be used where it is not concealed. The inserted end should always be pointed down to prevent condensation from dripping down the outside of the pipe. Other materials are being tested that may soon be found to be acceptable. In case they are, they will be presented to the trade.

Where chimneys are laid up with cement joints great care should be exercised to make sure that the joints are perfectly smoothed up on the inside. Should the joint be left in the rough it reduces flue area and causes friction.

Flues should be as straight as possible and offsets should never be at a greater angle than 30 deg. from the plumb line, unless it is absolutely necessary to run flues at a greater angle. In all cases where it is necessary to run flues at a greater angle than 30 deg. the size should be increased.

Where two gas heating appliances are vented into a riser at the same point, from opposite sides of the flue, a partition plate or finn should be placed in the flue between the heaters to permit of their independent operation. Where two radiators or heaters are set side by side and connected to a tee that fits into the flue a fin should be placed in the tee to permit of the independent operation of each appliance. This directs the products of combustion into the riser and prevents them from passing from one heater into the other. It is good practice to extend the connection from the heater to the riser horizontally back to the riser. The drip can then be fitted to the base of the riser. This prevents the condensation from dripping into the heater.

In cases where wrought or cast iron vent pipes are

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installed provision should always be made at the base of each riser for the removal of scale, which will accumulate in time. This same provision should also be made wherever there is an abrupt angle in the pipe. These drips should be removed periodically for cleaning.

Where the lowest point of a riser ends at a radiator, a nipple of liberal size should be screwed to the lower threads of the tee that connects the radiator to the vent. This forms a pocket to catch the scale and prevents stoppage that it would cause. If an elbow were used, scale would accumulate in an elbow. This nipple or pocket will also gather the condensation. A smaller pipe should be connected to the tee by means of a reducer this pipe to carry off the condensation. It should connect to a sewer, or some other means of disposing of the condensation should be provided for.

In combustion, hydrogen combines with oxygen of the air and forms water to the extent of an average of approximately forty pounds for each 1,000 cu. ft. of gas burned. When the flue temperature is 212 deg Fahr. or over, the water passes out through the flue as a vapor. When the vent is lower than 212 deg. this water vapor condenses on the walls of the flue and runs to the lowest point of the riser. This is the reason for the necessity of providing drip connections that will prevent the water from drippig into the heater.

Flues should always be carried to a point not lower than the highest ridge of the house in order to prevent down drafts. If the surrounding buildings and trees are higher than the top of the riser, down drafts are liable to occur. In cases where the wind blows down on a chimney a chimney cap should be fitted to the top of the flue.

Increasing the Size of Risers

There are many factors that tend to make it necessary to increase the sizes of risers. A number of these are herewith given. Offsets, turns or horizontal runs in the riser. If there is a possibility of adding additional heaters to a riser or if more than one heater is attached to a riser. Everything that would tend to reduce the draft should be taken into consideration.

Gas fires do not require as much flue area as coal or wood fires. Gas heaters operate more efficiently if the flue is not too large. Square or round flues are to be preferred. Oblong flues, if not too narrow, are used to advantage when they are set up inside of walls.

As is the case with coal, wood or liquid fuel fires, the size of a flue for a gas fire should be in direct proportion to the amount of fuel consumed. A simple rule that is in general use is for finding the capacity of a chimney for steam heating plants can be adapted also to finding the capacity for flues for vented gas radiators.

Rule

Divide one-half of the square feet of direct radiation by the square root of the height of the chimney. The result is the required area of the chimney in square inches.

Formula

$$\frac{\text{One-half square feet direct radiation}}{\text{Square root of height of chimney}} = \text{Required chimney area in square inches.}$$

Example

Number of square feet of radiation, 192;
Height of chimney, 36 ft.;
One-half of 192 equals 96;
The square root of 36 is 6;
96 divided by 6 equals 16 square inches;
Required area of a chimney 4x4 inches equals 16 square inches.

Where it is possible, vents for gas fires should be run within inside walls or exposed on the inside walls of rooms. It is not necessary that they should be placed on outside walls or under windows. Risers should not be subjected to extreme cold. If the products of combustion inside the riser are of the same temperature as the air on the outside; they, being heavier than the air, will not rise and be expelled through the vent. Heat inside the flue increases the volume of the contents of the flue and thereby reduces its weight. The rising currents cause what is commonly called a draft. Our best authorities estimate that the for every cubic foot of gas that is burned, seven cubic feet of air is required to support combustion. Just as rapidly as this air is removed from the room by the ventilating system it is replaced by air from outside sources through walls and around doors and windows and other openings. Were this not the case the removal of the air would impoverish the supply of oxygen required by the flame and the fire would be extinguished. If a heater consumes thirty feet of gas per hour it removes thirty times seven, or 210 cu. ft. of air. In addition to the air required for combustion a considerable quantity of air from the room is carried with it. This adds another advantage from the standpoint of ventilation.

Quoting a Physician

We frequently hear the statement that "Gas burns up the air in a room." Were this true a partial vacuum would be produced, and this is impossible. Dr. William Brady, M.D., contributes syndicated articles to newspapers throughout the country, under the heading of "Health Talks." The following is clipped from an article by Dr. Brady, published in the Duluth *Herald* of Nov. 13, 1920:

"Any known fuel burning in a room to produce heat must produce carbon-dioxide gas. That gas is the same as the burnt air given off from the lungs of man and animals. Within all ordinary limits, carbon-dioxide gas in the atmosphere of the living room or sleeping room is of no consequence; even what we might call involuntary ventilation, the seepage of air through the various cracks and crevices about doors and windows serves to keep the proportion of oxygen and carbon-dioxide gas about right, provided only the respiration of persons in the room is using up the oxygen and producing carbon-dioxide. But when you use a stove burning coal, wood, kerosene, gas or gasoline, ventilation must be freely provided lest harmful effects ensue. Whether any smoke or any odor is produced or not, it is of the utmost hygienic importance that every such heater should have direct pipe connection with the flue or chimney, to carry off the carbon-dioxide. Carbon-dioxide is not poisonous, but it may accumulate in sufficient proportion to crowd out the oxygen. That is how it produces its deleterious effects. Carbon-dioxide is odorless. Therefore, it is no criterion of hygienic perfection if the heat-

er without flue connection happens to give off no appreciable odor"

In the minutes of the South Central Gas Association meeting, as published in the *American Gas Engineering Journal* of Nov. 27, 1920, S. J. Ballanger is credited with the statement, "That the sale of non-vented gas heaters for house heating is acting as a boomerang because they were not sold and used strictly as chill chasers, adding that when gas heaters are intended for permanent heating purposes during long periods they should be always vented." This should be used as a keynote by gas companies.

When it is not practical to connect gas heaters to natural draft flues, there are types of heaters that can be connected to a main vent pipe. A suction fan electrically operated may be located near the outlet to the main vent pipe. This draws the products of combustion from the heaters and carries them to the outside.

There is a variation in the efficiency of installations, due to the conditions under which they have been installed. It is generally conceded that a heater of the non-vented type is practically 100 per cent efficient. Of course, this cannot be said of a ventilated heater, for it is necessary that a small portion of the heat is given off in heating the chimney and flue gases. This apparent disadvantage of the vented heater is offset from the fact that it is necessary to have windows open where non-vented heaters are used. There is an interesting example in New York City, where there are two business establishments that are located in adjoining buildings of the same size. One building is equipped with ventilating gas heaters, the other with non-vented heaters. Where the non-vented heaters are used, it is necessary to keep windows open and their gas fuel bills are greater than in the other building, where the vented heaters are used.

Tracing the Developments

The development of ventilating gas heating devices has been of benefit to the gas fraternity in that it has placed in their hands a method of overcoming what in the past has been an impossible situation—the proper heating of hospitals, sleeping rooms, living rooms and auditoriums, where there are large gatherings of people, and other interiors, where installations of heaters must be of a permanent nature.

In these cases the gasman is serving as a benefactor to the consumer, and there can be no misgivings on the part of any one concerned as to the future satisfaction of the customer. With ventilated heaters the gasman is building for the future, and the greater heating business in which he is to function eventually as the greatest factor in this field.

It is true that these installations cost a little more but it is worth the candle. The gasman must put his "best foot forward." There is too much stress at present put upon "What is the price?" The best and most efficient and complete article is the cheapest and most satisfactory in the long run.

There is use for permanent installations of ventilated gas heaters and radiators in practically every locality on this continent where gas is available. In the South, where the winters are mild, house heating by gas is accepted as an exclusive method for the all-year heating of buildings. This is also the case in many of the Northern States, where the winters are rigorous. In the extreme North, where coal furnaces must be operated for from eight to nine months during the year, it has been demonstrated that, with a small number of ventilators, gas heaters may be operated with economy and satisfaction to the user for from two to three months of this period, thus doing away with this operation of the coal heating plant while gas is being used.

"Ultimately Lower Utility Rates"

Indiana Public Utility Association Spreads Powerful Literature

"Ultimately Lower Utility Rates" is the title of one of the most trenchant pieces of literature that the Indiana Public Utility Association yet has placed before its public. In it the utility group in Indiana turn for argument to words of Ernest I. Lewis, formerly chairman of the Public Service Commission in Indiana and now a member of the Interstate Commerce Commission.

Mr. Lewis, who had perhaps as great an opportunity during the war period as any other man in America to study the crippling of the utilities of the country in the interests of winning the war; who had an unusual opportunity to watch the coal-shortage problems develop close at hand; who had studied gas and similar problems for decades before his State service as a newspaper correspondent, asked why utility rates are failing to fall readily and comparably with commodity prices. Then he answered himself:

"One may truthfully say that utility rates have advanced very little from pre-war levels." Nor were the utilities allowed to run up great percentages of earnings, as did other lines of business during the war, he showed. Then came this important statement:

"Time after time I, like other commissioners, heard a demand that the public utility be let go (during the war period) without earnings. I have seen come before me men making fortunes annually in the fabrication of flour, wares, commodities and the production of coal, stone and materials, protesting against relief to the seat of their operating energy. The injustice of it all seared your very soul. If utility rates did not double or treble or quadruple, it is, of course, impossible that they can contract like the prices of corn, wheat, coal, etc."

On the basis of this statement by Mr. Lewis, made, by the way, in a public address, the Indiana Public Utility Association is just circularizing its public with the following argument, of deep interest to every gas executive in America, who will be called on within the next few months or years, as the case may be, to answer a very unreasonable public clamor for lowered rates:

"Ultimately Lower Utility Rates

"When Secretary Hoover recently declared before the National Shoe and Leather Exposition in Boston that the fundamental necessity of getting produc-

tion costs down 'means that ultimately we must have much lower transportation rates,' he doubtless understood the full import of his qualifying adverb. It is much less certain that its significance is generally understood and accepted by the public.

"That the country needs much lower transportation charges as an essential part of the liquidation of the whole war-made scale of industrial costs must be admitted in his opinion, but it must also be recognized that freight and passenger (and other utility) rates were arbitrarily held down to a false relation with the cost of the service throughout the duration of the war and for two years after the armistice.

"Then, just when the Commerce Commission had made a belated adjustment of rates—'as nearly as may be'—to a cost level, the railroads and other business including all utilities were caught in the virtual collapse of all industry and commerce. The rate increases and the succeeding slump in business came hard upon a series of experiences which had left utilities stripped of all but the barest remnant of working capital or other liquid resources.

"What Secretary Hoover said about the railroad situation is pertinent at this time to utilities in general, for there is no question but that ultimately we will have lower rates for electric, gas, water and other utility service. But in the real interest of the general public itself, as well as the utilities, that time has not yet arrived, for it must be recognized that utility rates during the war period and up to practically the present time, have been held down to, as Mr. Hoover says, 'a false relation with the cost of the service throughout the duration of war and for two years after the armistice.' At present rates utilities are not any more than, if quite, earning 8 per cent. and a reasonable allowance for depreciation on the fair value of the properties, with the necessity for a large sum of money that should be spent on deferred maintenance to take care of the repairs that should have been made during the past four or five years, when there was no money available. In addition, there must be at least a reasonable earning over normal return to enable utilities at this time of high interest rates to interest capital to advance money with which to make betterments, enlargements and improvements that were of necessity stopped by practically all utilities during the past four or five years. An overpowering combination of adverse circumstances impoverished public service corporations and still continues to exert its baneful effects.

"Public utilities have no war record to live down for the sufficient reason that they could not be accused of profiteering; in fact, the public records do not show any payment of excess profit taxes during the war or thereafter by any public utilities.

"Practically all utilities have been compelled in the past four years to borrow from their local banks to tide them over the crisis of that period, with the result that they have not yet been able to reduce these bank loans and cannot do so without a continuation of existing rates for a reasonable time at least.

'During the past three or four years it is the exceptional case where large deficits have not accrued and the experience of utilities generally has been an earning of only from one to three per cent on the value of the property.

"Former Chairman Lewis of the Indiana Public Service Commission in a recent address before the National Electric Light Association, speaking from experience and thorough knowledge of the subject, said:

" 'Why are utility rates failing to fall readily and comparably with commodity prices?

" 'One reason, forgotten by a public that generally will be reasonable when it stops to reason, lies in the fact that utility rates, as a whole, did not advance comparably to commodity prices. One may truthfully say that utility rates have advanced very little from the pre-war levels. When everyone else—corporation, farmer, laborer, wholesaler, retailer, property owner—sailed away on the wild war-period flight, the public utilities and common carriers alone were anchored to mother earth by regulation, at no time overgenerous and often close to the point of starvation. They were not permitted to enjoy earnings running into the hundreds of per cent of war-period profits; no, not even 50 per cent or 25 per cent; and there is not a regulator who has not heard a war-profit-taken community protesting, with all the soul that could be mustered, against the public utilities which were, and are, their very life, being given an earning of 6 or 7 per cent.

" 'Time after time I, like other commissioners, heard a demand that the public utility be let go without earning. I have seen come before me men making fortunes annually in the fabrication of flour, wares, commodities and the production of coal, stone and materials, protesting against relief to the seat of their operating energy. The injustice of it seared your very soul. If utility rates did not double or treble or quadruple, it is, of course, impossible that they can contract like the prices of corn, wheat, coal, etc.'

"Utilities have had some measure of relief through a relatively small reduction in cost of coal and other materials. Taxes and freight rates have greatly increased while wage scales of utilities have not been reduced to any large extent, due to the fact that it was not possible generally to increase them during the war period to the high prices paid by other industries. In most cases, due to the large volume of petitions filed with public service commissions for rate increases during the critical two or three year period, many months elapsed from the time relief was asked for before orders were issued by the commission granting increases, and in many cases operating costs had increased during such interval to such an extent as to make necessary the filing of further petitions for increases of rates practically at the time former petitions for increases were granted.

"It is therefore clearly evident that in the interest of furnishing the service that the public requires and placing public utilities on a reasonably sound basis, that rates should decline less rapidly than operating costs, and reductions should not now be contemplated by commissions."

As an example of how much needed is some sort of intelligent discussion of this question for the general public, came a summary from the Public Service Commission of Indiana in which it was pointed out that nine Indiana municipalities now have petitions pending before the commission asking for a decrease in rates of various public utilities throughout the State. These cases all are separate proceedings brought by municipal officials "with a view of obtaining relief from alleged excessive rates fixed in

war time" and they have no connection with the scores of protests filed by the cities against proposed rate increases initiated in petitions filed by utility corporations.

Many of the petitions demanding a revision of present utility rates, were filed recently, indicating, it is said, a concerted drive on the part of municipal officials to obtain decreased charges for utility service. It is simply a situation wherein the utility properties throughout the State again are to be subjected to unthinking, unreasonable "squeezing." Apparently it is going to take the utter collapse of two or three big utility systems in this part of the country to bring home to the customers of utility service the fact that the utilities no longer are war profiteers and, indeed, never dreamed of being.

Cities Represent Many Sections

The cities now seeking a reduction of utility rates in Indiana, represent many sections of the State and the utility corporations affected by the petitions include those serving electricity, gas, telephone service and heating service to customers. Hearing of these cases will constitute one of the more important phases of the work of the Indiana Public Service Commission this fall.

Cities now before the Indiana commission with pleas for rate reductions, the names of the utilities affected and the nature of the petition are shown herewith:

City of Elkhart Elkhart Gas & Fuel Company, reduction of gas rates; city of Laporte, Laporte Gas & Electric Company, revision of gas and electric rates; citizens of Marion and Elwood, Ind., General Service Company, reduction of hot water heating rates; Steuben County Farmers Federation, Steuben County Telephone Company, reduction of telephone rates; town of Wolcottville, Lagrange County Light & Power Company, withdrawal of emergency electric rates; town of Lagrange, Lagrange County Light & Power Company, reduction of electric rates; Rochester school city, United Public Service Company, reduction of heating rates, and city of Goshen, Goshen Gas Company, reduction of gas rates.

The list is believed to be the largest similar list on the commission's docket at any one time, and members of the Indiana commission have indicated that each of the cases will receive particular and careful attention.

A sentence or two in a summary, made of the list of petitions by a local newspaper, almost struck fear to the hearts of those who think carefully about the utilities of the future. Here's what the summary said:

"An analysis of the petitions filed by the cities reveals a belief on the part of city officials and consumers generally that the peak in the cost of producing public utility service has long since passed. Most of the rates complained of in the petitions were established by the commission during the emergency wartime period. Rates of some of the utilities were increased a number of times by the commission to meet emergency conditions.

"The cities, in arguing for a decrease in utility rates, point to alleged decline in the costs of coal and labor as important items to be considered in revising existing schedules. Under the law, the Public Service Commission is required to establish rates which will provide a fair return for utilities on the amount of capital invested in the projects. However, the present commission has shown a disposition to make careful inquiry into the proper valuations of utility properties Commissioners, during the course of hearings on recent petitions have repeatedly assured counsel for Indiana cities that no inflated valuations will be considered by the commission in fixing rates."

Thus doth the course of politics and the backwash of the war apparently control the fate of Indiana utility development.

The Indiana Public Utility Association is doing all it can to offset this unfortunate condition of the public mind and, in an educational way, to show how valuable the protection of the utility properties of the State for the functioning of future years in Indiana is to be. Just now it seems to be a battle between political demagoguery and the association, fighting for the life of its members against a public viewpoint which, as Mr. Lewis points out, "generally will be reasonable, when it stops to reason."

Different Gravity Gases in Holders

(*Continued from page* 483.)

holder through the same inlet (see table A). All other methods seem to indicate stratification of the mixture.

TABLE A

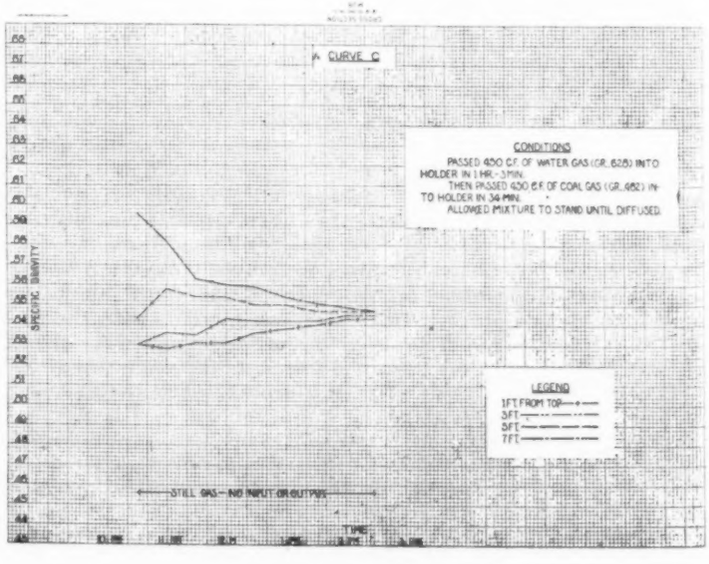
Holder filled through same inlet with 450 cu. ft. of water gas (gr. 0.603) and 450 cu. ft. of coal gas (gr. 0.462).—No output.

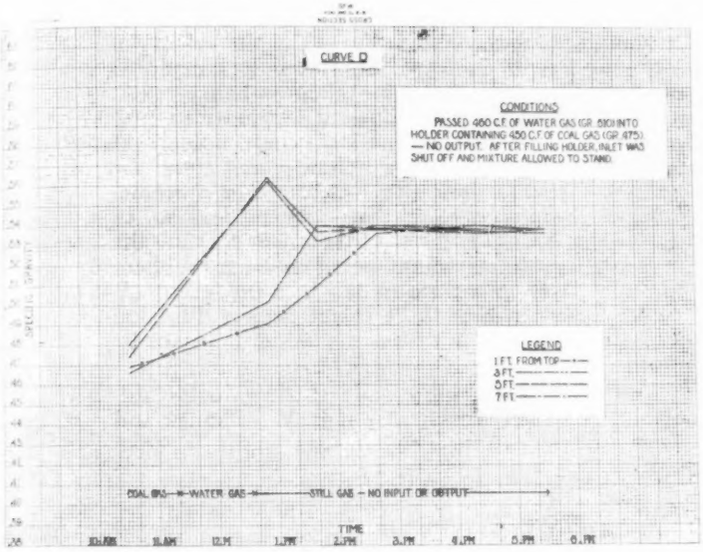
Time of filling: 10.40 a. m. to 12.35 p. m.—1 hr. 20 min.

SPECIFIC GRAVITY

	—Distance from Top or Crown of Holder (Ft.)—							
Time	0′	1′	2′	3′	4′	5′	6′	7′
12.30.....	0.541	0.541	0.541	0.541	0.541	0.541	0.541	*0.717
1.00.....	0.537	0.537	0.537	0.537	0.537	0.537	0.537	0.552
2.50.....	0.537	0.537	0.537	0.537	0.537	0.537	0.537	0.537
4.00.....	0.537	0.537	0.537	0.537	0.537	0.537	0.537	0.537
Following Day:								
8.30.....	0.530	0.530	0.529	0.530	*0.538	0.530	0.530	0.530

*Doubtful reading.


CURVE C
CONDITIONS
PASSED 450 C.F. OF WATER GAS (GR. 625) INTO HOLDER IN 1 HR.-3 MIN.
THEN PASSED 450 C.F. OF COAL GAS (GR. 662) INTO HOLDER IN 34 MIN.
ALLOWED MIXTURE TO STAND UNTIL DIFFUSED
SPECIFIC GRAVITY
LEGEND
1FT FROM TOP
3FT
5FT
7FT
STILL GAS - NO INPUT OR OUTPUT
TIME


CURVE D
CONDITIONS
PASSED 460 C.F. OF WATER GAS (GR. .510) INTO HOLDER CONTAINING 450 C.F. OF COAL GAS (GR. .475). — NO OUTPUT. AFTER FILLING HOLDER, INLET WAS SHUT OFF AND MIXTURE ALLOWED TO STAND.
LEGEND
1 FT. FROM TOP
3 FT.
5 FT.
7 FT.
COAL GAS — WATER GAS — STILL GAS — NO INPUT OR OUTPUT
SPECIFIC GRAVITY
TIME

2. Two gases flowing simultaneously into the holder through separate inlets, with no outlet, diffuse gradually. Curve B indicates that it required approximately five hours, after the inlet was closed off, before the still gas reached a uniform mixture throughout the holder.

3. When a holder is filled with two different gases at different times, with no output, and after filling, the inlet is shut off, the still gas requires considerable time to completely diffuse. The diffusion seems to be more rapid when a lighter gas is first put in than when a heavier gas is first put in (see curves C and d).

4. When a gas is put into a holder containing gas of different composition and gravity than that being put in, and a flow out of the holder is maintained equal to the input, there is an arcing across of the gas from the inlet to the outlet. This arcing across occurs approximately one to two feet from the water line. The mixture in the holder, as a whole, is more uniform where a light gas is passed into a holder containing a heavier gas, than where a heavier gas is passed into a holder containing a lighter gas. It follows, therefore, that after closing inlet and outlet the still gas more rapidly reaches a uniform mixture (see curves E and F).

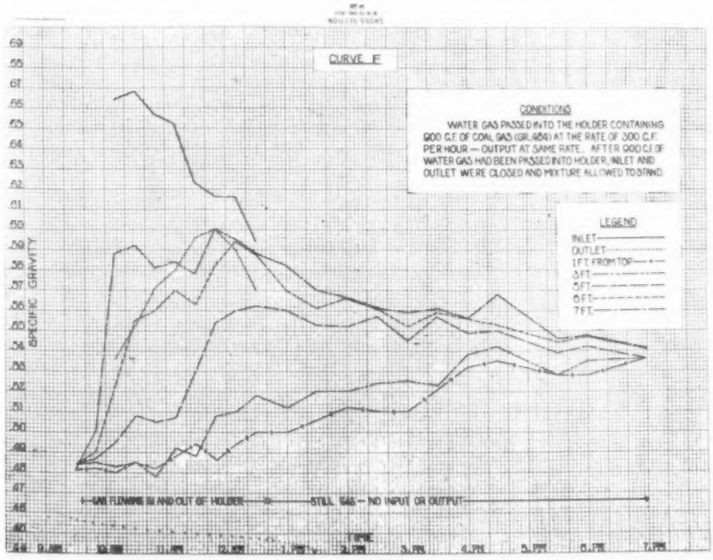
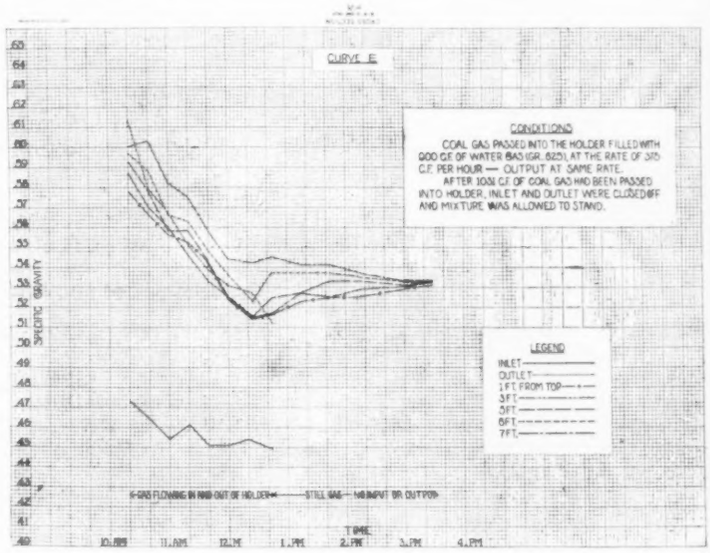

CURVE F
CONDITIONS
WATER GAS PASSED INTO THE HOLDER CONTAINING 600 C.F. OF COAL GAS (GR. .456) AT THE RATE OF 300 C.F. PER HOUR — OUTPUT AT SAME RATE. AFTER 600 C.F. OF WATER GAS HAD BEEN PASSED INTO HOLDER, INLET AND OUTLET WERE CLOSED AND MIXTURE ALLOWED TO STAND.
LEGEND
INLET
OUTLET
1 FT. FROM TOP
3 FT.
5 FT.
7 FT.
GAS FLOWING IN AND OUT OF HOLDER — STILL GAS — NO INPUT OR OUTPUT
SPECIFIC GRAVITY
TIME

TABLE B

Holder filled through separate inlets with 475 cu. ft. of water gas (gr. 0.624) and 484 cu. ft. of coal gas (gr. 0.469).—No output.

Time of filling: 10.00 a. m. to 11.20 a. m.—1 hr. 20 min.


CURVE E
CONDITIONS
COAL GAS PASSED INTO THE HOLDER FILLED WITH 600 C.F. OF WATER GAS (GR. .625) AT THE RATE OF 375 C.F. PER HOUR — OUTPUT AT SAME RATE. AFTER 1030 C.F. OF COAL GAS HAD BEEN PASSED INTO HOLDER, INLET AND OUTLET WERE CLOSED OFF AND MIXTURE WAS ALLOWED TO STAND.
LEGEND
INLET
OUTLET
1 FT. FROM TOP
3 FT.
5 FT.
7 FT.
GAS FLOWING IN AND OUT OF HOLDER — STILL GAS — NO INPUT OR OUTPUT
SPECIFIC GRAVITY
TIME

SPECIFIC GRAVITY

—Distance from Top or Crown of Holder (Ft.)—

Time	0′	1′	2′	3′	4′	5′	6′	7′
10.30.....	0.528	0.538	0.538	0.558	0.578	....	....	....
10.45.....	0.532	0.522	0.525	0.535	0.577	0.588	....	....
11.00.....	0.529	0.532	0.537	0.537	0.541	0.587	....	....
11.30.....	0.535	0.535	0.535	0.538	0.542	0.548	0.573	0.589
12.00.....	0.532	0.532	0.535	0.540	0.545	0.552	0.576	0.589
12.30.....	0.542	0.544	0.542	0.542	0.549	0.557	0.570	0.570
1.00.....	0.531	0.531	0.531	0.537	0.548	0.557	0.570	0.570
1.30.....	0.538	0.538	0.538	0.538	0.545	0.553	0.556	0.560
2.00.....	0.548	0.544	0.542	0.544	0.548	0.560	0.560	0.560
2.30.....	0.539	0.539	0.539	0.546	0.552	0.558	0.558	0.558
3.00.....	0.543	0.543	0.543	0.545	0.553	0.557	0.560	0.560
3.30.....	0.540	0.540	0.542	0.542	0.545	0.548	0.557	0.562
4.00.....	0.545	0.542	0.545	0.548	0.551	0.551	0.554	0.551
4.30.....	0.548	0.548	0.545	0.542	0.542	0.548	0.550	0.551

TABLE C

Passed 450 cu. ft. of water gas (gr. 0.628) into holder in 1 hr. 3 min. Then passed 450 cu. ft. of coal gas (gr. 0.462) into holder in 34 min. Allowed mixture to stand until diffused.

Water gas into holder: 8.45 a. m. to 9.48 a. m.

Coal gas into holder: 9.50 a. m. to 10.24 a. m.

SPECIFIC GRAVITY

—Distance from Top or Crown of Holder (Ft.)—

Time	0′	1′	2′	3′	4′	5′	6′	7′
10.30 a.m.	0.528	0.530	0.530	0.530	0.540	0.543	0.567	0.596
11.00.....	0.528	0.528	0.532	0.536	0.540	0.558	0.566	0.582
11.30.....	0.531	0.531	0.533	0.535	0.545	0.554	0.558	0.563
12.00 m..	0.531	0.531	0.535	0.543	0.550	0.554	0.558	0.560
12.30 p.m.	0.536	0.536	0.542	0.542	0.545	0.550	0.554	0.559
1.00.....	0.538	0.538	0.540	0.542	0.547	0.550	0.552	0.554
1.30.....	0.540	0.540	0.542	0.542	0.545	0.547	0.551	0.551
2.00.....	0.541	0.543	0.545	0.545	0.547	0.547	0.549	0.549
2.30.....	0.543	0.543	0.543	0.545	0.545	0.547	0.547	0.547

TABLE D

Passed 460 cu. ft. of water gas (gr. 0.610) into holder containing 450 cu. ft. of coal gas (gr. 0.475).—No output. After filling holder, inlet was shut off and mixture allowed to stand.

Water gas into holder: 11.20 a. m. to 12.35 p. m.

SPECIFIC GRAVITY

	—Distance from Top or Crown of Holder (Ft.)—							
Time	0′	1′	2′	3′	4′	5′	6′	7′
10.30.....	0.469	0.469	0.469	0.466	0.464	0.474	0.486	0.480
12.50.....	0.500	0.491	0.494	0.502	0.518	0.564	0.568	0.562
1.40.....	0.495	0.510	0.505	0.540	0.532	0.537	0.534	0.532
2.40.....	0.529	0.536	0.540	0.538	0.536	0.538	0.536	0.540
4.20.....	0.537	0.540	0.534	0.537	0.542	0.536	0.538	0.538
5.30.....	0.538	0.538	0.538	0.536	0.538	0.538	0.536	0.538

It is unfortunate that time did not permit further experimental work, as the results obtained indicated further experimental work with other conditions would be of interest.

It should be again stated that while the results of these experiments indicate the statements made as being true they should not be taken as being conditions that would work out in actual operation, until verified on a large scale with a large-sized holder. It may be that tests on a larger holder would show the conditions found in these experiments to be more decided than here shown, or they may be less so, or entirely different. It is believed, however, that the results justify the statement being made that where different gravity gases are mixed in a holder conditions may be such that there is not perfect diffusion and that the gas sent out from the holder may not be uniform in gravity.

Acknowledgment is here made of the valuable aid, in conducting the experiments, of B. W. Cikanek and Charles Coltrin of the Peoples Gas Light & Coke Company.

TABLE E

Coal gas passed into the holder filled with 900 cu. ft. of water gas (gr. 0.625), at the rate of 375 cu. ft. per hour—output at same rate.

After 1,031 cu. ft. of coal gas had been passed into holder, inlet and outlet were closed off and mixture was allowed to stand.

Water gas into holder: 8.15 to 9.57 a. m. Coal gas into holder: 10.00 a. m. to 12.45 p. m.

SPECIFIC GRAVITY

	—Distance from Top or Crown of Holder (Ft.)—									
Time	0′	1′	2′	3′	4′	5′	6′	7′	Inlet	Outlet
10.20 a.m.	0.578	0.578	0.578	0.588	0.588	0.593	0.597	0.600	0.473	0.614
10.40.....	0.570	0.566	0.570	0.570	0.578	0.578	0.588	0.603	0.464	0.579
11.00.....	0.556	0.556	0.556	0.560	0.560	0.558	0.566	0.582	0.454	0.567
11.20.....	0.552	0.552	0.550	0.546	0.554	0.558	0.563	0.575	0.461	0.551
11.40.....	0.533	0.533	0.533	0.533	0.533	0.543	0.548	0.558	0.451	0.539
12.00 m.	0.525	0.525	0.525	0.525	0.525	0.525	0.536	0.544	0.451	0.531
12.25 p.m.	0.517	0.515	0.517	0.515	0.515	0.515	0.523	0.542	0.454	0.527
12.45.....	0.517	0.517	0.517	0.517	0.521	0.525	0.537	0.545	0.447	0.512
1.15.....	0.523	0.523	0.525	0.527	0.527	0.527	0.537	0.541	....	....
1.45.....	0.525	0.525	0.525	0.525	0.525	0.533	0.537	0.541	....	....
2.15.....	0.525	0.525	0.527	0.529	0.531	0.533	0.535	0.537	....	....
3.00.....	0.529	0.529	0.529	0.531	0.531	0.531	0.533	0.533	....	....
3.30.....	0.531	0.531	0.531	0.533	0.531	0.533	0.533	0.533	....	....

TABLE F

Water gas passed into the holder containing 900 cu. ft. of coal gas (gr. 0.484), at the rate of 300 cu. ft. per hour. Output at same rate. After 900 cu. ft. of water gas had been passed into holder, inlet and outlet were closed and mixture allowed to stand.

Coal gas into holder: 9.05 a. m. to 9.25 a. m. Water gas into holder: 9.35 a. m. to 12.40 p. m.

SPECIFIC GRAVITY

	—Distance from Top or Crown of Holder (Ft.)—									
Time	0′	1′	2′	3′	4′	5′	6′	7′	Inlet	Outlet
9.30.....	0.484	0.481	0.484	0.484	0.484	0.484	0.484	0.481	....	....
9.50.....	0.480	0.482	0.485	0.485	0.487	0.487	0.490	0.500	....	....
10.10.....	0.480	0.480	0.483	0.483	0.488	0.495	0.522	0.588	0.664	0.536
10.30.....	0.480	0.485	0.485	0.485	0.499	0.508	0.555	0.592	0.668	0.552
10.50.....	0.495	0.482	0.480	0.478	0.496	0.505	0.560	0.581	0.657	0.571
11.10.....	0.488	0.488	0.488	0.494	0.500	0.507	0.570	0.584	0.652	0.580
11.30.....	0.490	0.494	0.494	0.488	0.504	0.530	0.563	0.578	0.623	0.596
11.50.....	0.486	0.486	0.490	0.508	0.546	0.554	0.582	0.600	0.616	0.600
12.10.....	0.490	0.494	0.502	0.510	0.546	0.560	0.594	0.595	0.616	0.590
12.30.....	0.500	0.500	0.510	0.518	0.537	0.562	0.588	0.588	0.594	0.570
1.00.....	0.500	0.500	0.506	0.512	0.538	0.560	0.570	0.582	....	....
1.30.....	0.506	0.506	0.509	0.520	0.539	0.553	0.561	0.570	....	....
2.00.....	0.512	0.512	0.517	0.520	0.538	0.552	0.566	0.566	....	....
2.30.....	0.510	0.510	0.520	0.524	0.536	0.557	0.561	0.561	....	....
3.00.....	0.510	0.510	0.513	0.525	0.537	0.545	0.552	0.559	....	....
3.30.....	0.521	0.521	0.523	0.523	0.540	0.557	0.559	0.561	....	....
4.00.....	0.528	0.532	0.535	0.538	0.538	0.549	0.556	0.556	....	....
4.30.....	0.535	0.535	0.538	0.542	0.549	0.550	0.553	0.568	....	....
5.30.....	0.528	0.528	0.528	0.528	0.534	0.539	0.544	0.546	....	....
6.00.....	0.528	0.528	0.530	0.535	0.539	0.542	0.547	0.547	....	....
7.00.....	0.536	0.536	0.536	0.536	0.536	0.536	0.541	0.541	....	....

Public Utilities Securities Market Report

Prices of Representative Gas Bonds

(Quotations furnished by The National City Company)

Company	Issue	Maturity	Nov. 25, 1921 Bid	Asked
American Lt. & Trac. Co.	Five Year 6s	May 1, 1925	95½	96½
Brooklyn Union Gas Co.	First Consol. 5s	May 1, 1945	87	89
Columbia Gas & Elec. Co.	First 5s	May 1, 1945	87	89
Consol. Gas, Elec. Lt. & Pr. Co. of Baltimore	First Ref. 7½s	Dec. 1, 1945	104	106
Consol. Gas, Elec. Lt. & Pr. Co.	General 4½s	Feb. 14, 1935	80	81
Consol. Gas Co. of New York	Sec. Conv. 7s	Feb. 1, 1925	104	104¼
Consol. Gas Co. of New York	One Year Sec. 8s	Dec. 1, 1921	100	100¼
New Amsterdam Gas Co.	First Consol. 5s	Jan. 1, 1948	79	83
Denver Gas & Elec. Co.	Gen. (now 1st) 5s	May 1, 1949	81	83
Detroit City Gas Co.	Gold 5s	Jan. 1, 1923	96	98
Equitable Illum. Gas Lt. Co. of Philadelphia	First 5s	Jan. 1, 1928	99	102
Hudson County Gas Co.	First 5s	Nov. 1, 1949	79	82
Laclede Gas Light Co.	Ref. & Ext. 5s	Apr. 1, 1943	89	91
Louisville Gas & Elec. Co.	First & Ref. 7s	June 1, 1923	98	100
Michigan Light Co.	First & Ref. 5s	Mar. 1, 1946	76	79
Milwaukee Gas Light Co.	First 4s	May 1, 1927	83½	85
Pacific Gas & Elec. Co.	Gen. & Ref. 5s	Jan. 1, 1942	89	90
Pacific Gas & Elec. Co.	Col. Tr. Conv. 7s	May 1, 1925	100	101
Pacific Gas & Elec. Co.	First & Ref. 7s	Dec. 1, 1940	106	108
Cal. Gas & Elec. Corp.	Unif. & Ref. 5s	Nov. 1, 1937	93	95
Peoples' Gas Lt. & Coke Co.	Refunding 5s	Sept. 1, 1947	82½	84
Chicago Gas Lt. & Coke Co.	First 5s	July 1, 1937	86	87½
Portland Gas & Coke Co.	First & Ref. 5s	Jan. 1, 1940	83½	86
Seattle Lighting Co.	Refunding 5s	Oct. 1, 1949	71	74
Southern California Gas Co.	First 6s	Nov. 1, 1950	90	94
United Gas Improvement Co.	Two Year 8s	Feb. 1, 1923	100	101
Utica Gas & Electric Co.	Ref. & Ext. 5s	July 1, 1957	81	84
Washington Gas Light Co.	General 5s	Nov. 1, 1960	83	85
Western States Gas & Elec. Co. of California	First & Ref. 5s	June 1, 1941	80	84

Issue All Sold

The National City Company, of New York, has announced that the issue of $20,000,000 Consolidated Gas Company of New York one-year 7 per cent secured gold notes has all been sold. The notes were offered to dealers on a firm basis and no public subscriptions were invited. This issue in no way changes the financing program of the New York Edison Company, which plans to go ahead as soon as approval is obtained from the Public Service Commission with its $25,000,000 6 per cent flotation.

Threaten Foreclosure on Bonds

Memphis, Tenn.—Holders of mortgages on Memphis Gas & Electric Company property have demanded a foreclosure, because the company for more than two years has defaulted on payment of interest on certain bonds.

Federal Judge J. Will Ross has signed an order authorizing the foreclosure procedure.

Proceedings, originating in New York and Chicago, where financial control of the company has been centered since its formation, probably will mean a loss of thousands of dollars to Memphis holders of gas and electric company stock.

Franchises of the company are effected in no way by this action of the mortgagees. Service in neither the electric nor the gas branches of the corporation will be affected in any degree.

Bond Issue

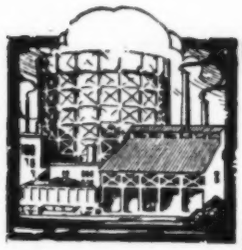
Atlanta, Ga.—In order to take care of its floating debt the Georgia Railway & Power Company, owners of the Atlanta Gas Light Company, a subsidiary organization, has requested permission of the Georgia State Railroad Commission to issue $4,000,000 of bonds, bearing interest at 7 per cent and running for twenty years. Arrangements have been made with the Bankers Trust Company, of New York, to handle the bonds.

Bond Sales Authorized

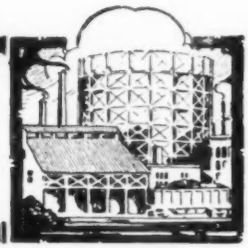
San Francisco, Cal.—The Western States Gas & Electric Company has been authorized by the Railroad Commission to issue and sell $200,000 of its first and refunding mortgage sinking fund 5 per cent gold bonds at not less than 80 per cent of their face value plus accrued interest and to use the proceeds to finance in part construction expenditures made prior to September 30.

Agreement Reached in Meridian

Meridian, Miss.—Following the recent voting of $600,000 in bonds for the construction here of a municipal lighting plant, gas, electric and street railway utilities have reached an agreement with the city administration, subject to ratification by the voters at the polls. The agreement provided for the operation of the properties of the Meridian Light & Railway Company through a board of directors with the balance of power in the hands of representatives of the city. Mayor John W. Parker will act as chairman of the board.



NEWS OF THE GAS INDUSTRY



Michigan Companies Report Increased Business

Ann Arbor, Mich.—Gas and electric light companies in small communities all over Michigan are extending their facilities to meet increased demands. The aggressiveness of local chambers of commerce in procuring industries is partly responsible and the increasing realization of the fact that gas and electricity are the most efficient, dependable and economical domestic servants, are given by company officials as the reasons behind the demand for more capacity. Here are a few of the additions to plants that have been made or planned in this State within the last five or six weeks:

At Lapeer, the Lapeer Gas-Electric has contracted for a 640-horsepower engine, to be in operation about the second week in November. This engine will relieve the present equipment during peak load hours. New regulating equipment to assure uniformity of flow is also being installed. The improvement will total $25,000.

In the interests of more efficient service, the Consumers Power Company of Cadillac, is eliminating all direct current equipment in that city as rapidly as possible and substituting alternating current. The increas efficiency resulting, according to local advices, is meeting with general favor. The Cadillac Gas Company is constructing a new tank in that city which will have a capacity of 100,000 cu. ft. At present there is only one tank in the city, with a capacity of 38,000 cu. ft. The tank will cost $20,000 to build.

Lenawee and Hillsdale County farmers will profit principally by the decision of the Southern Michigan Light & Power Company, of Hudson, to extend its system from this city to North Adams. Several villages on the way and most of the farms would be able to obtain power.

The Michigan Gas & Electric Company has been voted permission to supply the gas and light to the village of Goblesville and vicinity.

Gas Holder for Aviation Field

The work for the new aviation field which will be located near Belleville, Ill., includes among other equipment, a 500,000 cu. ft. gas holder for storage of hydrogen. The general contract for this work is in the hands of the W. M. Sutherland Building & Contracting Company, who have sublet the gas holder to the Western Gas Construction Company.

This is the fourth large gas holder this company has installed within the St. Louis district, which includes among other a 500,000 cu. ft. holder at Shrewsbury, a 1,000,000 cu. ft. holder at the same plant and a 1,000,000, cu. ft. holder built within the city of St. Louis. Personal inspection of work previously done by these builders no doubt, was a great factor in securing them the contract for the Government holder.

Rochester Gas & Electric

Rochester, N. Y.—The Rochester Gas & Electric Corporation does the entire commercial electric light and power and gas business in the city of Rochester and various adjoining municipalities. It also supplies steam for heating and industrial purposes and sells coke and other by-products of the gas plants. The company disposed of its traction interests in 1912 and at present does no street railway business. Power is derived both from hydro-electric and steam plants, but the hydro-electric properties supply about 65 per cent of the total electric current sold by the company.

The company owns and operates about 90 per cent of the water power of the Genesee River within the city limits. Net earnings covered all fixed charges between 1.53 and 1.91 times each year during the period 1910-1919 and 1.47 times in 1920. Rochester Gas & Electric is controlled through ownership of virtually its entire common stock by the Mohawk Valley Company, which in turn is controlled by the New York Central Railroad. After meeting fixed charges the company has been able to pay dividends on its preferred stock over a long period of years. Franchises under which business is conducted, with only a few unimportant exceptions, are unlimited as to time.

Gas Company Men Enjoy Evening

About fifty of the employees of the Fulton County Gas & Electric Company, attended the meeting of the Employees Association, which was held Nov. 7 in the company's office at Gloversville. General Manager L. C. Smith and Engineer Edward Ehman, gave short talks that were listened to with a great deal of interest by the men.

It was voted that the president appoint two committees as follows: Welfare and Sick.

Following the business session, musical selections by the recently formed orchestra did much to enliven the evening, after which refreshments were served.

Penalty for Slow Payment of Gas Bills Continued

Jefferson City, Mo.—The State Public Service Commission has ruled that the Laclede Gas Light Company, of St. Louis, may continue to impose a penalty of 10 cents a thousand cubic feet on customers who do not pay their bills promptly.

The decision, written by Commissioner Bean, says the purpose of imposing a penalty for slow payment or allowing a discount for prompt payment is to induce promptness and to diminish collection expenses and to place on the delinquent customer the extra cost caused by his failure to pay promptly.

Galveston Company's Record for Continuous Service

Galveston, Texas.—Strikes, baseball seasons and holidays come and go but the service of the Galveston Gas Company goes on forever. Such is the principle of operation upon which one of the city's oldest public utilities is based, and the record which the company holds for continuous service to the people of Galveston is an unique and unusual one.

According to P. E. Nicholls, vice-president and general manager of the company, had the threatened walkout of railway employees taken place recently, as scheduled, the Galveston Gas Company would have been able to maintain service for at least two months. A large amount of material, principally coke, necessary for the manufacture of gas is now on hand at the yards of the plant. The policy of preparedness for the threatened tie-up of the transportation facilities of the country by the Galveston Gas Company is but in line with the practice of the company in past years, and which has made the Galveston Gas Company one of the most efficient public utilities of the city.

The Galveston Gas Company was founded in 1856 at a time when Galveston was but a small village and the greater part of Texas a wild and uninhabited section of the country. The incidents connected with the early history of the company are recalled by William Vanden Ende, who has been an employee of the company for fifty two years, and who is now superintendent of the plant.

Among the interesting chapters in the life of the company in which Mr. Ende has taken a part are the storms of 1875, 1900 and 1915, as well as the big fire of 1887. Temporary setbacks were suffered by the company on each occasion, especially in 1900, when it was necessary to rebuild the plant. But if the setback was temporary on each occasion the effects of the disastrous events also meant much to the good of the company, for out of the debris and ruins of the storm and fire-swept plants there arose a new and more efficient plant. Only small damage was suffered by the plant of the company in 1915, and service was shut off but three days.

When the company was originated in 1856 gas was sold for $8 per thousand cubic feet and used for illuminating purposes only. During the life of the company gas has revolutionized the work of the housewife as well as numerous industrial processes, and as has quantity production been increased so has there been a lowering in gas rates until the present rate is $1.45 per thousand cubic feet. The rate here is the same as in Houston, and represents the minimum price which is being charged for the product in the South, Mr. Nicholls said.

In line with the policy of the company in keeping abreast and ahead of the development of Galveston, a number of improvements have been made at the local plant preparatory for the coming winter. A total of approximately $50,000 has been spent by the company in extending its main lines into the east, south and west portions of the city, a 3,000-bushel purifier has been purchased, which will add 25 per cent to the purifying and distribution departments of the plant, and a 100-horsepower blasting unit has been ordered, which will be added to the general equipment.

Approximately 6,500 meters are now in use in the city, which indicates that at least 75 per cent of the people of Galveston use gas. According to an estimate made by Mr. Nicholls, approximately 1,175,000 gal. of oil and 6,200,000 lb. of coke will be required to supply the gas consumption for the year 1921. The estimate is based upon the consumption of last year and the probable consumption of the new users which have been obtained by the company since the beginning of this year.

Natural Gas Rates Increased 30 Per Cent

Santa Maria, Cal.—Santa Maria and other communities served by the Santa Maria Gas Company, including San Luis Obispo, Arroyo Grande, Pismo, Guadalupe, Avila, Betteravia, Nipomo, Orcutt and Sisquoc, will pay an increase in gas rates ranging from 25 to 30 per cent for natural gas under a recent ruling of the California State Railroad Commission.

The increase was granted at the request of the above company on the ground of added labor and material costs and increased taxes.

The old rate of $1 a thousand cubic feet had been in effect since 1913 or earlier. The new rates will be $1.25 and $1.30 per thousand cubic feet, with an additional 5 cents in the outlying territories served.

As the present rates had been put into effect before the Railroad Commission acquired control over local service utilities, the commission ordered a readjustment of schedules for different service and rules and regulations were ordered modified to meet the commission's requirements. In determining the rate base the commission cut the company's claim of an investment of $846,551 in operating physical property to $707,800.

The company schedules for Santa Maria and consumers along the Orcutt Road are $1.25 a thousand for the first 5,000 cu. ft. per meter per month, $1.15 a thousand for the next 10,000 cu. ft., $1.10 for the next 35,000, and $1 a thousand for all over 50,000 cu. ft. In San Luis Obispo the schedules range 5 cents higher a thousand and in Arroyo Grande, Pismo, Guadalupe, Betteravia and Sisquoc the range is 10 cents higher to the smaller consumers, due to greater transmission costs.

The above decision is the result of several postponed hearings on the part of the commission and thorough investigation work by commission engineers. Protests on the part of several civic bodies were heard by the commission and the above decision followed many months of study.

Large Flywheel Is Put into Place

Oklahoma City, Okla.—The large flywheel for the huge engine being installed at the plant of the Oklahoma Gas & Electric Company was put into place last week. Weight of the wheel is seventy tons, making 100 tons for the bearings to support. Special pulleys were required to put the large pieces into shape. Diameter of the cylinder is greater than an ordinary man's neight.

Complete installation, including switchboards, pumps and other minor parts, is expected some time next month, giving machinery of sufficient capacity to meet any emergency.

Will Reduce Service Charge

Middletown, Conn.—Partial elimination of the unpopular service charge for gas consumers in Middletown by a reduction of 25 cents per month, effective Jan. 1, 1922, is promised by the officials of the Middletown Gas Light Company, as the result of a conference between a committee of the common council and officials of the company.

Personal Notes

THE FOSTER BROOKS GAS COMPANY, of Bradford, Pa., which supplied gas for Foster township, has filed a new rate of tariff with the Public Service Commission. The increase approximates 40 per cent.

ALLEN P. MCCARTHY has been appointed manager of the American Gas Light Company's business in Bangor, Me. Mr. McCarthy has been manager of the company's branch at Pottstown, Pa., where he was located for a number of years, and was a member of the Rotary Club of Pottstown and of the Pottstown Chamber of Commerce.

Mr. McCarthy succeeds George M. Dolley, who returned to Bangor from Logansport, Ind., when O. A. Merchant, Jr., resigned to go to Amsterdam, N. Y. Mr. Dolley has been transferred to the American Gas Light Company's branch at Belleville, Ill. During his several years here Mr. Dolley has been active in chamber of commerce committees and his departure will be regretted by his many friends who will wish him success in his new field.

T. V. SANDERSON, superintendent of the South Carolina Light, Power & Railways Company, of Spartanburg, S. C., has resigned his position.

J. H. AXTELL, electrical engineer for the South Carolina Light, Power & Railways Company, of Spartanburg, S. C., has been appointed general superintendent of manufacture and distribution of the gas department, manufacture and distribution of the electric department, also street railways department.

CARL A. WENDELL, of New York, is a consulting engineer of the Federal Bureau of Mines in matters pertaining to coal washing and preparation. Mr. Wendell, formerly in charge of coal-washing investigations for the United States Steel Corporation, has since 1913 been acting in a general consulting capacity.

H. B. PEARSON has been made managing director of the Canadian Western Natural Gas, Light, Heat & Power Company, Ltd., Alberta, Canada. Mr. Pearson has been with the company for ten years.

H. J. HOOVER, ex-president of the Natural Gas Association, has returned to his several "jobs" after a month's illness.

PAUL HEATH, now located at Franklin, Pa., as secretary and sales manager of the Penn-Franklin Lubricating Company, is well known among gas and oil men as the former manager in Chicago of the Foco Oil Company.

EUGENE COSTE has resigned as president and chief engineer of the Western Canadian Natural Gas Company and is now in France visiting his daughter. A personal friend of Mr. Coste has said, "To those who knew him intimately he was a most charming, lovable and cultured man. To come into close contact with him, one could but appreciate his high scientific ability. He was known all over the continent as an eminent man. If one went into the Bureau of Mines at Washington and asked for the five most eminent geologists of the continent, Eugene Coste's name would be amongst them." According to announcement by the board of directors of the Western Natural Gas Company, Mr. Coste will not be connected with its management.

May Build Gas Plant

Tracy, Cal.—The prospects are bright for Tracy to have a gas plant in the near future, J. F. Beales, a constructing engineer of Los Angeles, and J. J. Etter, a former merchant of Madera, were in Tracy recently looking into the matter.

Beales was here three years ago and expected to put in a plant then, but not enough consumers were found to justify the venture, nor were financial conditions right. Now it is felt that there will be enough signers, and Beales states that he has the necessary financial backing. He says that if 400 consumers can be signed up to use gas the plant is assured. The gas plant will cost about $60,000, and the rate will be from $2 to $2.50. The cost for installing gas for each consumer and putting in a simple stove will, according to Beales, average $15. If 400 householders can be found who wish the service at this cost, the plant can be put up in ninety days.

Beales and Etter consulted the secretary of the chamber of commerce, who gave them data and showed them two feasible sites on the east side of town. The sition will be presented at the forum meeting of the chamber of commerce within the near future.

L. H. Scherck Is Dead

Poughkeepsie, N. Y.—Leon H. Scherck, 45 years of age, general sales manager of the Central Hudson Gas & Electric Company, of this city, well known in Poughkeepsie, and prominent in many civic activities, died suddenly at his home, 121 South Hamilton Street, at 4.30 o'clock on Wednesday afternoon, Nov. 16. Death was caused by angina pectoris. Mr. Scherck, who had attended a conference of the company earlier in the day, complained of not feeling well and went to his home. He retired to his bed and expired a short time afterwards.

Mr. Scherck was one of the best-known business men of the city. In his connection with the local company he was nationally known for his authority in dealing with matters coming to the attention of such companies. He had been general sales manager of the Central Hudson Gas & Electric Company for the last twelve years and had entire jurisdiction of the territory of the company from Cornwall through to Albany. He was also active in directing the general character and public policy of the company.

Mr. Scherck came to Poughkeepsie in 1909. Before coming here he was associated with Isador Newman & Sons, bankers, of New Orleans, and later with Ford, Bacon & Davis, engineers, of New York City. He held important positions with each of these firms.

Mr. Scherck was born at New Orleans in 1876. He was graduated from Tulane University of New Orleans.

Mr. Scherck was president of the Poughkeepsie Chamber of Commerce about four years ago, preceding the presidency of William De Garmo Smith. While president of the chamber Mr. Scherck inaugurated several important changes for the betterment of city affairs. He was considered as a man of unusual ability in dealing with the important civic and business problems, which fitted him admirably for the position. He was very active during the Liberty loan drives here, and was one of the principal speakers at the many meetings held in support of the drives.